The graphs of Figure A1A-5 clearly show that the BPL signals range from 10 to 15 dB, on average, over a 1 microvolt signal. These are loud and very audible in any voice-capability receiver tuned in this range. (Due to the characteristics of 21 MHz propagation, sky wave signals were essentially non-existent in the evening hours.)

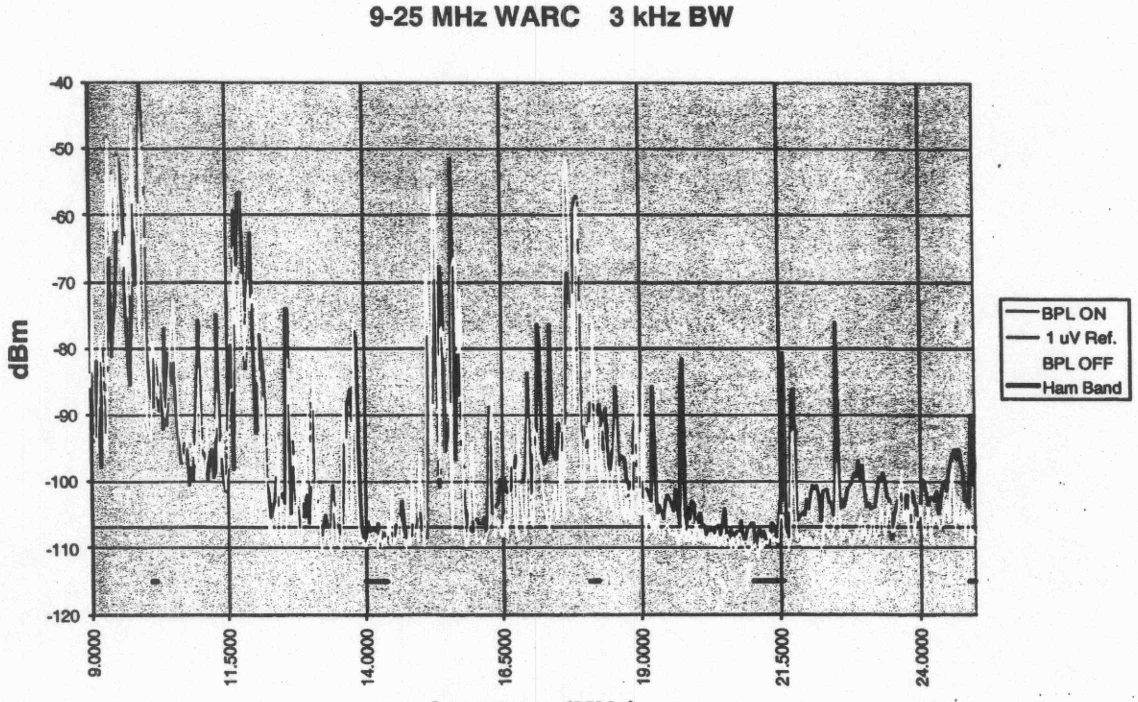


Fig. A1A-6: The spectrum from 9 to 25 MHz as seen by the WARC dipole. All three WARC bands are visible in this sweep, with 30m being to the left, 17m just right of center, and 12m at the far right edge.

These plots were taken late afternoon on two different days; at this point in the solar cycle, sky wave propagation above 20 MHz was nearly non-existent. However, strong signals which appear in the ranges below 20 MHz are a mix of sky wave (communication) signals, noise bursts and transients, and some BPL (blue trace).

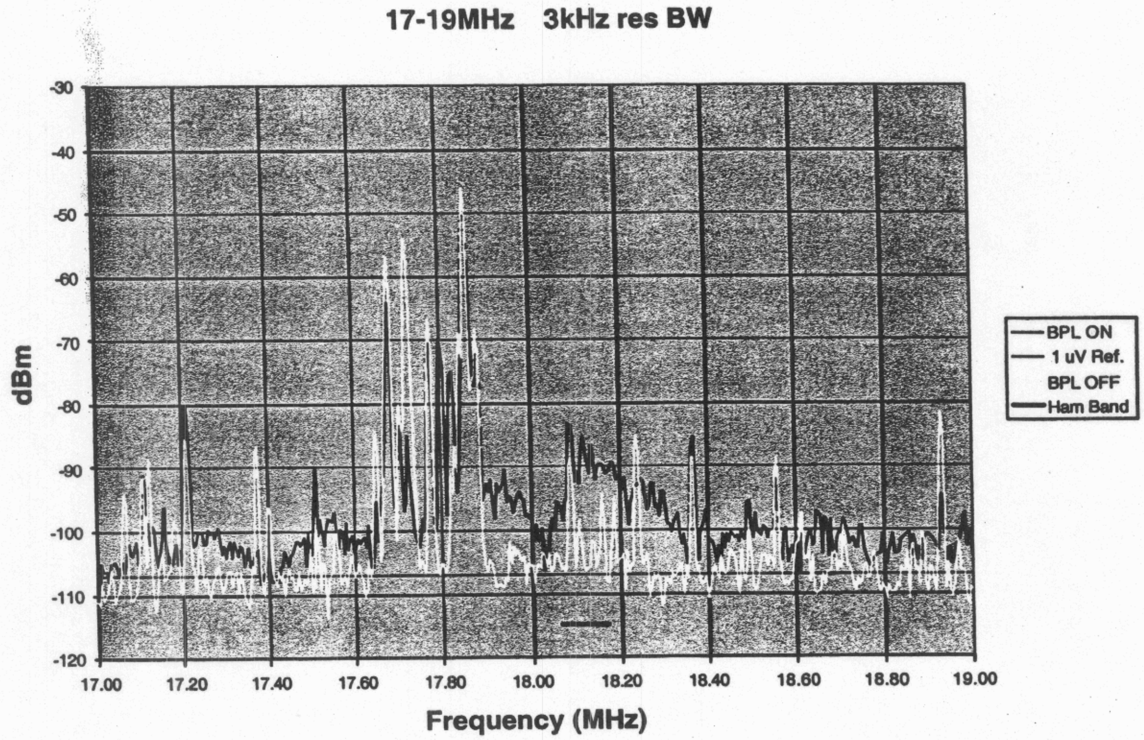
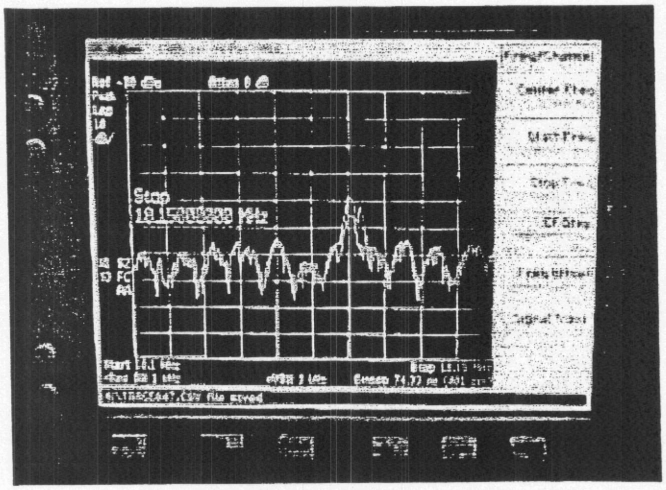


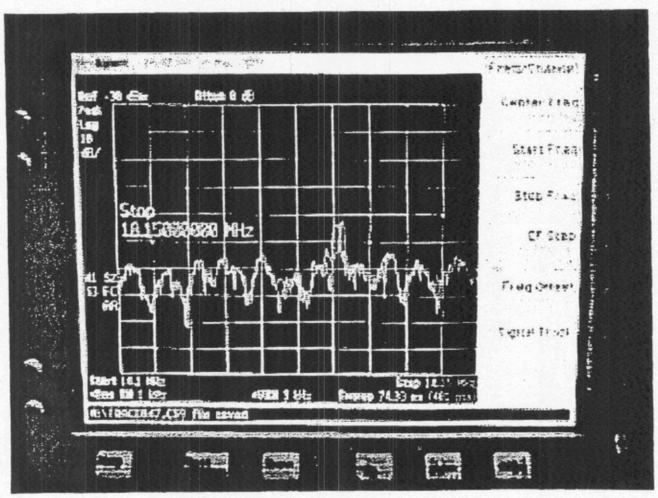
Fig. A1A-7: Spectrum detail between 17 and 19 MHz using the WARC dipole. The Amateur 17m band (which is 18.068 to 18.168 MHz) is just right of center. It appears that the BPL signals (blue trace) may have been notched; if so, the notch was not correct, being too low in frequency.

PART B: Spectrum Analyzer Sweep Photographs

The changing nature of BPL signals makes it very difficult to capture the transition that occurs during the periodic operation of the BPL system. This is especially true for spectrum analyzer sweeps that are being stored as data. The nature of the instrument is such that it "freezes" the signal captured by its circuits at the nearest instant in time that the sweep in progress completes when the "File Save" function is invoked. While it is possible to visually compare stored traces, or even overlay them for comparative analysis on a single graph, the most compelling image is that seen when the signal changes on a real-time dynamic basis. Some of these events were captured with fortuitous digital photographs that were taken as a transition occurred during spectrum analyzer multiple sweeps of one camera frame exposure. Here are some examples of those captured transitions:

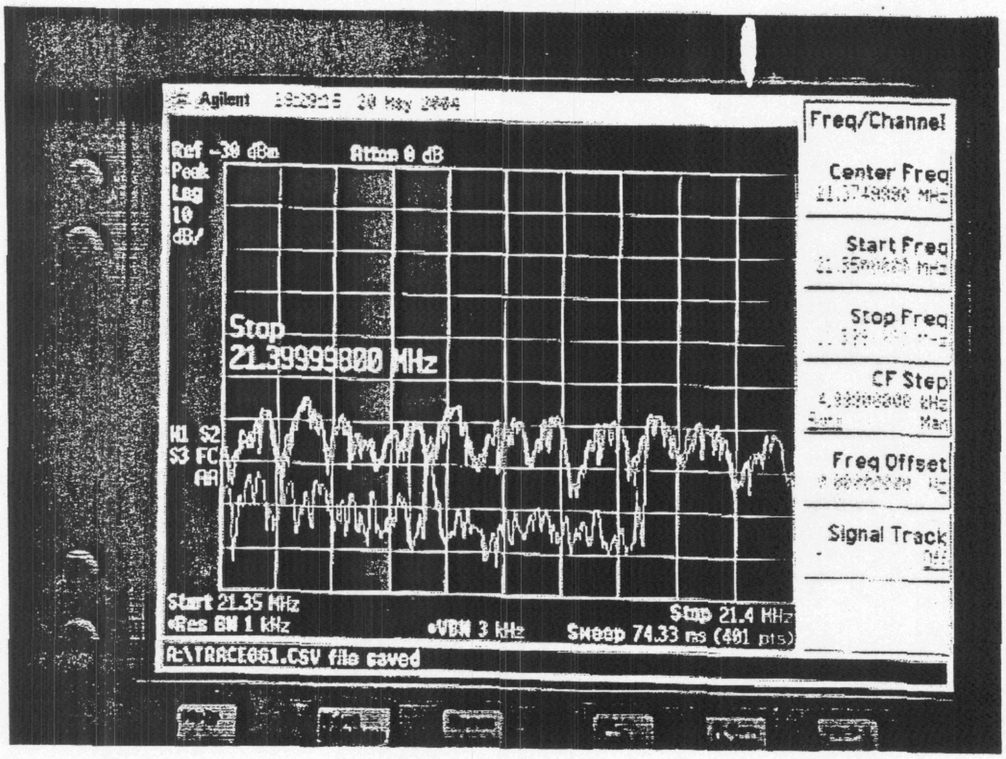
Note: These photographs are presented as supplemental to the data plots of Part A of this Appendix. For discussion purposes, the top of the spectrum analyzer graph is at the Reference Level of -30dBm. Each division on the vertical axis is 10 dB. An approximation of the signal level at any given frequency within the sweep range can be seen in the photographs. Detailed plots with full data were taken, but the transitions were not captured on any single graph. The resolution bandwidth used for all of these sweeps was 1 kHz so as to improve imaging of the BPL signal carriers.

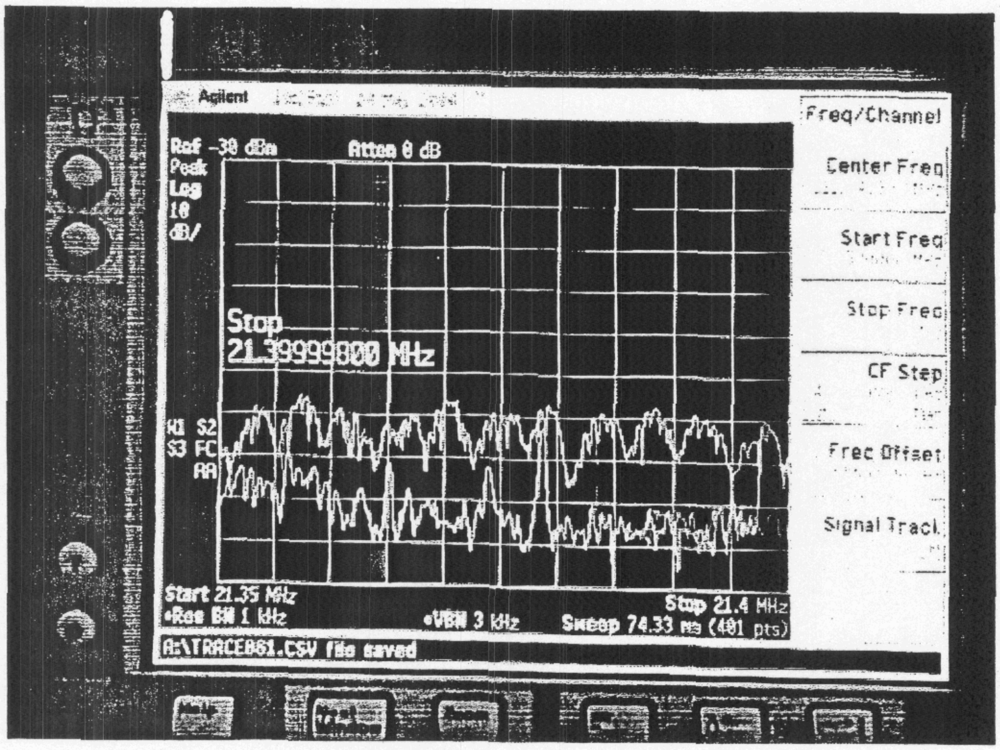




Figures A1B-1 (upper) and A1B-2 (lower)

These figures show two sets of sweeps from 18.1 MHz to 18.15 MHz in which the highest level BPL signal (slightly right of center) was transitioning due to its OFDM modulation.





Figures A1B-3 (upper) and A1B-4 (lower)

These figures each show two successive sweeps from 21.35 MHz to 21.4 MHz in which the BPL signals were transitioning between levels. The average level change across the frequency span was about 20 dB, although some carriers went to a peak as most of the others lowered. Figure A1B-3 actually caught the transition in progress (right end of trace).

APPENDIX 2
COMMUNICATION RECEIVER CHARACTERISTICS

The term "communication receiver" has been used several times in this report. It has also been stated that the spectrum analyzer's characteristics have been carefully matched to those of communication receivers so that the net data taking environment would closely replicate that of the typical Amateur Radio HF station. The noise floor (which defines the lowest level of signal that can be visually detected on the sweep trace) of the E4411B spectrum analyzers, when using an IF filter bandwidth of 3 kHz and video filter of equal or greater bandwidth, is about -110 dBm, or approximately 0.7 microvolts ("μV"). This places the spectrum analyzer within an order of magnitude for sensitivity (at comparable bandwidth) of most communication receivers (see Table A2-1). At 1 kHz IF filter bandwidth, and 300 Hz video filter bandwidth, the noise floor is at -115 dBm, or approximately 0.4 μV. These bandwidth settings were used to visualize the individual BPL carriers.

Due to the variabilities of HF sky wave and ground wave propagation, HF receivers must have high sensitivity[12] and effective automatic gain control ("AGC") to combat fading. Yet, as the ARRL test lab notes in their extended product test reports[13], "Most modern receivers have a noise floor within a few dB of 'perfect'. A perfect receiver would hear only the noise of a resistor at room temperature. However, especially for HF receiving systems, the system noise floor is rarely determined by the receiver. In most cases, external noise is many dB higher than the receiver's internal noise. In this case, it is the external factors that determine system noise performance. Making the receiver more sensitive will only allow it to hear more noise." Thus, designers of communication receivers have to work a fine design line between adequate sensitivity and sensitivity that is too great and which detracts from, rather than contributes to, useful communications.

Table A2-1 presents typical sensitivity (and related IF bandwidths, when the information is available) for a number of typical communication receivers, both past and current. Rohde *et al* state that for AM reception, a good receiver should have a nominal sensitivity of about 1.5 μV with a 6 kHz bandwidth for a 10 dB signal to noise ratio ("S/N"); a good SSB receiver should have about 0.1 to 0.3 μV sensitivity for 10 dB S/N, and a receiver for Morse, or CW, signals, should have a sensitivity of about 0.03 to 0.1 μV with a filter bandwidth on the order of 150 to 500 Hz[14]. Note that all of the sensitivity requirements noted are for achieving a specified signal-to-noise ratio, not a specific noise floor value.

The conclusion from examining the characteristics of the receivers in Table A2-1 and the performance of the E4411B is that a modern spectrum analyzer is capable of closely replicating the performance of communication receivers. The information presented above, and the data in Table A2-1, also show that receivers used by Radio Amateurs are on par with the state of the art and well suited to their intended purpose. One potentially negative aspect of many HF receivers (or receiving portion of transceivers) is that a pre-amplifier is included to boost weak signal sensitivity. This may be a useful feature under certain conditions, but the user of such a radio soon becomes aware that extra sensitivity results in just what the ARRL states – all that is heard is more noise. Fortunately, the pre-amplifiers are usually selectable for "in" and "out", and many receivers also include internal attenuators. These tend to decrease effective sensitivity, but under some circumstances, can actually improve the S/N of the desired signal. Skilled HF communicators know how to make use of their equipment's characteristics.

---

[12] *Communication Receivers: Principles and Design,* Ulrich L. Rohde, Jerry C. Whitaker, T.T.N. Bucher, McGraw-Hill, Second Edition, 1997, pg. 11.

[13] ARRL Laboratory Expanded Test-Result Report (any of many such reports), introductory remarks to the receiver noise floor tests. These expanded reports are available to ARRL members via the ARRL web site.

[14] *Communication Receivers: Principles and Design,* Ulrich L. Rohde, Jerry C. Whitaker, T.T.N. Bucher, McGraw-Hill, Second Edition, 1997, pp. 58-59.

Table A2-1: Receiver Characteristics

Make/Model	Description	Receive Frequency Tuning Range[15]	Rated/Measured Sensitivity @ Bandwidth[15,16] or Mode	Rated/Measured S-Meter Response[15]
Alinco DX-70TH	Current model basic transceiver	150 kHz to 30 MHz; 50 to 54 MHz	1.8 to 30 MHz: 0.25 µV 50 to 54 MHz: 0.15 µV all @ 2.4 kHz bandwidth	50 µV @ 14 MHz = S-9, pre-amp on; 146 µV @ 14 MHz = S-9, pre-amp off
Collins 75S-1	Late 1950's tube receiver	3.4 to 30 MHz	3.4 to 30 MHz: 1.0 µV for 15 dB S+N/N @ 2.1 kHz	~ 100 µV = S-9
Collins 75S-3	Early 1960's tube receiver	3.4 to 30 MHz	3.4 to 30 MHz: 0.5 µV for 10 dB S+N/N @ 2.1 kHz	~ 60 µV = S-9
Collins KWM-380	Late 1970's solid state transceiver	1.6 to 29.999 MHz	1.6 to 29.999 MHz: <0.5 µV for 10 dB S+N/N	Varies by band, range of 14 to 28 µV for S-9
Icom IC-706 MkII G	Current model wide range transceiver	30 kHz to 200 MHz; 400 to 470 MHz	1.8 to 30 MHz: <0.15 µV; 50 to 54 MHz: <0.12 µV – CW/SSB modes in both ranges	11 µV @ 14.2 MHz = S-9, pre-amp on; 34 µV @14.2 MHz = S-9, pre-amp off
Icom IC-718	Current model basic level transceiver	30 kHz to 30 MHz	0.03 to 30 MHz: <0.16 µV for 10 dB S/N, CW/SSB modes	38 µV @ 14 MHz = S-9, pre-amp on; 149 µV @ 14 MHz = S-9, pre-amp off
Icom IC-765	Early 1990's deluxe model transceiver	Amateur bands 1.8 to 30 MHz	1.8 to 30 MHz: 0.15 µV with pre-amp on	24 µV @ 14 MHz = S-9, pre-amp on; 65 µV @ 14 MHz = S-9, pre-amp off
Japan Radio Company JRC-135HP	1990's model transceiver	100 kHz to 30 MHz	1.6 to 30 MHz: 0.31 µV	37 µV @ 14 MHz = S-9
Kenwood TS-570S(G)	Current model transceiver	500 kHz to 30 MHz; 30 to 60 MHz	1.7 to 24.5 MHz: 0.2 µV; 24.5 to 30 MHz: 0.13 µV; 50 to 54 MHz: 0.13 µV, all for 10 dB S+N/N, CW/SSB/FSK modes	25 µV @ 14 MHz = S-9, pre-amp on; 94 µV @ 14 MHz = S-9, pre-amp off; 12 µV @ 52 MHz = S-9, pre-amp on; 90 µV @ 52 MHz = S-9, pre-amp off.
Kenwood TS-2000	Current model wide range transceiver	30 kHz to 60 MHz; 118 to 174 MHz; 220 to 512 MHz	1.7 to 24.5 MHz: <0.2 µV; 24.5 to 30 MHz: <0.13 µV; 50 to 54 MHz: <0.13 µV, all for 10 dB S/N, CW/SSB modes	24 µV @ 14.2 MHz = S-9, pre-amp on; 110 µV @ 14.2 MHz = S-9, pre-amp off; 15 µV @ 52 MHz = S-9, pre-amp on; 170 µV @ 52 MHz = S-9, pre-amp off.
Lowe HF-150	Early 1990's basic receiver	30 kHz to 30 MHz	0.5 to 30 MHz: 0.5 µV, pre-amp off; 0.2 µV pre-amp on, all for 10 dB S+N/N @ 2.6 kHz SSB bandwidth	N/A (receiver does not have an S-meter)

[15] Information taken from manufacturer's specification sheets or from ARRL test lab reports. In some cases, S-meter performance will vary by band or frequency range.
[16] Rated bandwidth information is from ARRL test lab reports, when available. In some cases, no information is available to indicate the bandwidth used for determining performance specifications.

Make/Model	Description	Receive Frequency Tuning Range[17]	Rated/Measured Sensitivity @ Bandwidth[17,18] or Mode	Rated/Measured S-Meter Response[17]
Ten-Tec Orion	Current model deluxe transceiver	Dual receivers: 100 kHz to 30 MHz and all Amateur bands 1.8 through 29.7 MHz	Amateur band receiver, full range: <0.18 μV typical for 10 dB S/N @ 2.4 kHz bandwidth	33 μV @ 14 MHz = S-9, pre-amp on; 135 μV @ 14 MHz = S-9, pre-amp off
Watkins-Johnson HF-1000	Mid-1990's deluxe receiver	5 kHz to 30 MHz	500 kHz to 30 MHz: 0.35 μV for 16 dB S+N/N @ 300 Hz bandwidth (CW mode), pre-amp off	Meter is calibrated in dBm, not S-units; -73 dBm (50 μV) input @ 14 MHz = reading of -85 dBm.
Yaesu FT-857	Current model wide range transceiver	100 kHz to 56 MHz; 76 to 108 MHz; 118 to 164 MHz; 420 to 470 MHz	1.8 to 30 MHz: <0.2 μV; 50 to 54 MHz: <0.13 μV – CW/SSB modes in both ranges	6.6 μV @ 14.2 MHz = S-9, pre-amp on; 17 μV @ 14.2 MHz = S-9, pre-amp off; 5.3 μV @ 52 MHz = S-9, pre-amp on; 14 μV @ 52 MHz = S-9, pre-amp off.
Yaesu FT-1000 MP Mark-V Field	Current model deluxe transceiver	100 kHz to 30 MHz	1.8 to 30 MHz: <0.16 μV @ 2.0 kHz bandwidth – SSB/CW modes	48 μV @ 14.2 MHz = S-9, pre-amp on; 135 μV @ 14.2 MHz = S-9, pre-amp off

[17] Information taken from manufacturer's specification sheets or from ARRL test lab reports. In some cases, S-meter performance will vary by band or frequency range.
[18] Rated bandwidth information is from ARRL test lab reports, when available. In some cases, no information is available to indicate the bandwidth used for determining performance specifications.

James Burtle

From:	dgsvetan@rockwellcollins.com
Sent:	Thursday, October 07, 2004 2:51 PM
To:	Anh Wride; Alan Stillwell; Riley Hollingsworth; James Burtle
Cc:	w1rfi@arrl.org
Subject:	BPL Notching Effectiveness

pic22190.jpg (33 KB) pic01842.jpg (31 KB) Communication Receiver Charact...

All recipients,

I sent the message below to Ms. Wilkerson earlier today. I believe that the experiences with the Alliant Energy BPL trials in Cedar Rapids, IA, provide clear indication that notching of BPL spectrum, as presently done, is not, and will not be, a viable means to mitigate interference to Amateur Radio operators and other users of the HF and low VHF spectrum. Further, keep in mind that these unacceptable interference levels were occuring at distances of about 180 meters from the active BPL node, a far greater distance than will be the case for BPL riding down neighborhood power lines on every residential street and alley, thus likely passing within 10 or 20 meters of Amateur station antennas.

Thank you for your consideration of the information.

Dale Svetanoff

----- Forwarded by Dale G Svetanoff/CedarRapids/RockwellCollins on 10/07/2004 01:26 PM -----

Dale G Svetanoff
10/07/2004 11:55 AM

To: Sheryl.Wilkerson@fcc.gov
cc: (bcc: Dale G Svetanoff/CedarRapids/RockwellCollins)
Subject: BPL Notching Effectiveness

Dear Ms Wilkerson:

I am the EMC engineer who performed the RFI investigation at the home of Mr. James Spencer, licensee of the Amateur Radio Call W0SR, here in Cedar Rapids, IA. As you probably know, Alliant Energy conducted a BPL trial here in the Spring of this year. Mr. Spencer's ability to conduct two-way HF communications was adversely affected by the BPL signals, and that was the situation which led to my making test readings at his station location.

Briefly, station W0SR is located about 180 meters from the nearest active BPL node of the trial system. Interference from the trial BPL system lasted the entire time that the system was active, which was from late March through late June, 2004. Alliant Energy, and their equipment vendor, Amperion, did employ both frequency notching and system signal transmission level adjustment during the trial period, with varying degrees of effectiveness, and none of it successful at eliminating harmful levels of interference within the assigned Amateur Radio HF bands.

Here are two examples from the Test Report that I wrote on behalf of the Cedar Rapids BPL Steering Committee, and which was submitted to Alliant Energy and the FCC (as part of reply Comments on Docket 04-37):

This first figure shows the spectrum around the 17m Amateur Band, with the plot spanning

17.0 to 19.0 MHz. The 17m Band is denoted by the BLACK line near bottom center of the plot. The BLUE trace was made with the BPL system ON, and the YELLOW trace was made with the BPL system switched off (with due thanks to Alliant Energy). Note that there is a decrease in the blue trace at the lower frequency end of the 17m Band, and I believe that decrease to be an attempt to notch the band. However, please also note that the notch does not extend across the band and that the deepest part of the notch is actually below the 17m Band, making the notch's value worthless. The YELLOW signals are partly due to skywave signals (the traces were taken in late afternoon, when 17m would support skywave propagation) and partly from power line noise, a long standing problem at W0SR.

(Embedded image moved to file: pic22190.jpg)
The figure below shows the area just below and in the 10m Amateur Band. (The 28.0 to 29.7 MHz band is denoted by a black line on the plot.) Again, BLUE trace is BPL ON, and YELLOW is without BPL. In this plot, most of the yellow signals are skywave signals. Please note the following about this
plot:

1. The notching missed again. Although most of the 10m band has reduced BPL signal, the lower 100 kHz of the band is receiving full BPL signal strength.

2. The notching is NOT deep enough. Note that most of the yellow signals are of equal or lower amplitude than the notched BPL signals. It is those areas where communications are NOT possible and THAT is harmful interference!

3. In both this plot, and the one above, I added a MAGENTA trace line to the plot. That trace is at a level which represents 1 microvolt of signal in a 50 ohm system, or -107 dBm. The reason I added that trace is because most communication receivers are able to achieve somewhere around a 10 dB signal-to-noise ratio (or better) at 1 microvolt input. That is a very good number for conducting communications. HOWEVER, IF THERE IS ON-CHANNEL INTERFERENCE AT LEVELS OF 1 MICROVOLT OR MORE, THEN NO COMMUNICATIONS ARE POSSIBLE BECAUSE THE USABLE SIGNAL-TO-NOISE HAS BEEN REDUCED TO NEAR 0 dB.

(Embedded image moved to file: pic01842.jpg)

I submit my point #3, above, as the reason for my saying that notching to the levels presently achieved does not work. The in-notch signals would have to be about 20 to 30 dB LESS than they are in the above examples in order to be effective.

Just so that there is no confusion on anyone's part about the above plots, let me state the following:

A. All plots were taken at station W0SR using Agilent spectrum analyzers and saved onto floppy disc. Date and time stamps, with serial number of the spectrum analyzer, are available for all files.

B. All plots were made using the antennas and transmission lines of station W0SR - NOT compliance measurement antennas at 3m or 10m from the
power lines. The measurement bandwidth of the spectrum analyzers was set
at 3 kHz, NOT the compliance measurement bandwidth. That is because communication receivers use bandwidths of between 2 kHz and 3 kHz for voice SSB signal reception. The object of the testing was to duplicate what a communication receiver "sees" when BPL signals are within its tuned range.

C. The performance of the Agilent spectrum analyzers, at 3 kHz bandwidth, was within one (1) order of magnitude for signal sensitivity with respect to communication grade receivers. All plotted signals were more than 6 dB above the instrument noise floor.

I am attaching a file (extracted from the Cedar Rapids BPL Steering Committee report) that contains performance charts for modern communications receivers, as well as some of years past. Please note either the rated sensitivity levels or the levels at which acceptable signal-to-noise performance is achieved, but ONLY if there is no on-channel interference present. The actions and statements by the Commission to date on the BPL issue have been centered almost solely on radiated emissions compliance of the BPL systems and NOT on interference issues to spectrum users. Those users have communication antennas and receivers, not compliance antennas and spectrum analyzers. The situation at W0SR more than amply demonstrates why notching does not work and why it will not work in its present form. It also should be an indicator of what will happen when BPL signals are even closer to spectrum users than the 180m separation at this site.

Thank you for your consideration of this information.

Sincerely,

Dale Svetanoff, Amateur Radio Licensee WA9ENA
N.A.R.T.E Certified EMC Engineer, Cert. # EMC-001549-NE

<dgsvetan@rockwellcollins.com>

(319) 295-4928 Office
(319) 462-5984 Home

(See attached file: Communication Receiver Characteristics.doc)

Make/Model	Description	Receive Frequency Tuning Range[3]	Rated/Measured Sensitivity @ Bandwidth[3,4] or Mode	Rated/Measured S-Meter Response[3]
Ten-Tec Orion	Current model deluxe transceiver	Dual receivers: 100 kHz to 30 MHz and all Amateur bands 1.8 through 29.7 MHz	Amateur band receiver, full range: <0.18 µV typical for 10 dB S/N @ 2.4 kHz bandwidth	33 µV @ 14 MHz = S-9, pre-amp on; 135 µV @ 14 MHz = S-9, pre-amp off
Watkins-Johnson HF-1000	Mid-1990's deluxe receiver	5 kHz to 30 MHz	500 kHz to 30 MHz: 0.35 µV for 16 dB S+N/N @ 300 Hz bandwidth (CW mode), pre-amp off	Meter is calibrated in dBm, not S-units; -73 dBm (50 µV) input @ 14 MHz = reading of -85 dBm.
Yaesu FT-857	Current model wide range transceiver	100 kHz to 56 MHz; 76 to 108 MHz; 118 to 164 MHz; 420 to 470 MHz	1.8 to 30 MHz: <0.2 µV; 50 to 54 MHz: <0.13 µV – CW/SSB modes in both ranges	6.6 µV @ 14.2 MHz = S-9, pre-amp on; 17 µV @14.2 MHz = S-9, pre-amp off; 5.3 µV @ 52 MHz = S-9, pre-amp on; 14 µV @ 52 MHz = S-9, pre-amp off.
Yaesu FT-1000 MP Mark-V Field	Current model deluxe transceiver	100 kHz to 30 MHz	1.8 to 30 MHz: <0.16 µV @ 2.0 kHz bandwidth – SSB/CW modes	48 µV @ 14.2 MHz = S-9, pre-amp on; 135 µV @ 14.2 MHz = S-9, pre-amp off

[3] Information taken from manufacturer's specification sheets or from ARRL test lab reports. In some cases, S-meter performance will vary by band or frequency range.

[4] Rated bandwidth information is from ARRL test lab reports, when available. In some cases, no information is available to indicate the bandwidth used for determining performance specifications.

James Burtle

From: Jim Spencer [jlscr@mchsi.com]
Sent: Thursday, October 14, 2004 12:48 PM
To: James Burtle
Cc: Wade Walstrom; Ed Hare W1RFI
Subject: Re: BPL Notching--Actual Experience

Mr. Burtle:

Thank you for responding. From the text of my message you can see I was describing a JOINT effort with the system operator. My purpose in sending the letter to various FCC officials was to make the case that in a well-documented actual BPL operating environment, notching DID NOT work. Various quotes I've seen lead me to understand that the FCC believes "notching" will indeed solve BPL harmful interference problems. I have proof that it does not.

James L. Spencer

> ----- Original Message -----
> **From:** James Burtle
> **To:** Jim Spencer
> **Sent:** Wednesday, October 13, 2004 10:03 AM
> **Subject:** RE: BPL Notching--Actual Experience
>
> Mr. Spencer,
>
> I have received you complaint. Please make sure that you send a copy of all your complaints to the system operator.
>
> Jim Burtle
>
> *** Non-Public: For Internal Use Only ***
>
> -----Original Message-----
> **From:** Jim Spencer [mailto:jlscr@mchsi.com]
> **Sent:** Thursday, October 07, 2004 5:19 PM
> **To:** Anh Wride; Alan Stillwell; Riley Hollingsworth; James Burtle; Sheryl Wilkerson
> **Cc:** Ed Hare W1RFI; Wade Walstrom
> **Subject:** BPL Notching--Actual Experience
>
> I have seen numerous references made by the promoters of BPL stating that notching (or shifting frequency) techniques can be used to eliminate interference to licensed services using the HF spectrum. Speaking from actual experience, I can tell you that this IS NOT TRUE.
>
> I would add that the BPL interference I experienced was caused by an extremely simple test environment consisting of just four overhead nodes and three spans--just three sets of spread-spectrum frequencies. Any real-world deployment would be much more difficult to deal with.
>
> Alliant Energy in Cedar Rapids, Iowa started an evaluation of an Amperion system on March 30,

2004. I immediately observed extensive interference on most amateur frequencies at my home, some 600 feet away from the nearest node of the BPL system. I went to the test site where they were installing the last node and talked to the Amperion engineer, Tom Luecke. He verified that the frequencies where I found the interference were indeed caused by BPL. He also stated that the gains were set at a lower level to reduce interference and that the 20, 17, 15, 12 and 10 meter amateur bands were notched. Still, I had strong interference at or near S9 on at least part of all the notched bands! In addition, I had interference on the 40 and 30 meter bands. The true extent of the interference could not be determined due to unresolved power-line noise. The notching DID NOT WORK.

On May 25, 2004 I received a request from Alliant Energy asking that I again check my radio for BPL interference. They had received an email from Greg Solt at Amperion which stated: "we have gone back to re-evaluate the effectiveness of the notch filters that we activated in your system. We found that due to changes in some notching methods associated with our software packages, these notches were not working as efficiently as we would like and, in some cases, not working at all. The notches have now been fixed and verified as working correctly. We hope that this will address Mr. Spencer's concerns". I ran a scan of all HF amateur bands and found and reported the following: No BPL above the S9 power-line noise on 160 and 80 meters. On 40 metes I had S7 to S9 BPL. On 30, 20, 17 and 15 meters the BPL was S8 to S9. It was S3 on 12 meters and S8 on 10 meters. Clearly, the notching DID NOT WORK.

On June 1, 2004 I was contacted by Alliant Energy and asked to repeat my tests as the notching had been changed again. I ran the tests on that day and reported to Alliant the following levels of BPL interference: No BPL was detected on 160 and 80 meters in S9+ power-line noise. BPL interference was S8 to S9 on 40 meters, S7 on 30 meters, S9 on 20 meters, S8 on 17 meters, S8 to S9 on 15 meters, S8 on 12 meters. No BPL signals could be heard on 10 meters in S7 to S8 power-line noise. Clearly this notching configuration DID NOT WORK.

In a telephone conversation with Alliant Energy on June 4, 2004, I told them that the BPL frequencies had moved although they stated there had been no changes in the notching since before the June 1 tests. They later confirmed that the notching had indeed been changed. I ran a full set of tests and provided the results to Alliant on June 4. It showed no observable BPL on 160 meters in S9 + 20 db power-line noise and no BPL on 80 meters in S9 + 5 db power-line noise. On 40 meters the BPL signals were S8 to S9. On 30 meters the BPL signals were S8. On 20 meters there were no observable BPL signals above the S8 power-line noise. On 17 meters there were no BPL signals above S4 power-line noise. On 15, 12 and 10 meters there were no BPL signals in near zero power-line noise. In this case, notching partially worked but still caused significant interference to at least two amateur bands that I often use.

What they did in the last case would not work with a "real" BPL deployment. They had simply moved two of the three spread-spectrum ranges above 30 MHz to the Low VHF bands.
The important point here is, what would they do with a system with four spans? Or five? Or more as you would have in any "real" BPL system? Clearly there are not enough frequencies available to deploy a real operating BPL system and not interfere with amateurs and other licensed users of the HF and Low VHF spectrum.

The bottom line: At least with this Amperion system, notching DID NOT WORK.

Sincerely,

James L. Spencer, W0SR
3712 Tanager Dr. NE
Cedar Rapids, Iowa 52402

COMMENT TO DOCKET 04-37

Report of Harmful Interference From a Broadband Over Power Line Trial

or Deployment

Name of complainant: Tom Schrum

Call sign (if applicable): K7NII

Station location: Rocking Chair Road, Cottonwood, Arizona

Mailing address (if different): 406 Yaqui Circle, Camp Verde, Arizona

City, State, Zip:

Telephone: 928-567-3134 Email: N/A

Description of Interference: Very high noise floor + pulses making reception of the 10.368 test beacon useless

Description of station: 10.368GHz preamps/mixer (+28MHz post-amp & low pass filter (interference entering at 28MHz IF freq

Receiver(s) affected: Yaesu FT-817 used as 28MHz IF receiver

Antenna type: 25" dish

Antenna location: Rocking Chair Road - Cottonwood, Arizona

Distance of antenna from own house (feet): Portable station

Distance of antenna from neighboring houses (feet):

five

Distance of antenna from power distribution line or equipment (feet): 100'

Comment on 04-37

Log of interference:

Date	Time	Frequency	Receive Mode	Interfering signal strength	Description
May 19, 2004	9:00 AM - 11:30 AM LOCAL TIME	10.368 GHz 28 MHz. IF FREQ	C.W.	TOTAL SATURATION of 28 MHZ IF BAND	HIGH NOISE FLOOR ACCOMPANIED BY PULSES & GARBAGE LEAVING RECEPTION USELESS

PLEASE CEASE OFFENDER'S OPERATION SO WE CAN CONTINUE OUR TESTING

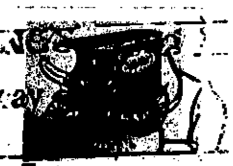
Thank You

Tom Schrum K7NJ

Tom Schrum
406 S Yaqui Ct.
Camp Verde, AZ 86322-7104

PHOENIX AZ 850 10
PM
19 JUN
2004

GREETINGS
FROM
Far Far Away



RECEIVED & INSPECTED
JUN 28 2004
~~FCC - MAILROOM~~

Federal Communications Commission
James R. Burtle
Chief, Experimental Licensing Branch
Room 7-A267
445 12th Street SW
Washington DC
20[illegible]

mes Burtle

om: Ernie & Betsy Cummings [k6xf@commspeed.net]
ent: Wednesday, June 16, 2004 11:11 PM
o: Anh Wride; Alan Stillwell; Riley Hollingsworth; James Burtle
ubject: Interference from Broadband Over Power Line Transmission

o: Federal Communications Commission

rom: Floyd E. Cummings - K6XF (Ernie)

ubject: Report of Harmful Interference
rom a Broadband Over Power Line Transmission
OTTONWOOD, ARIZONA 86326

lease open the attached file in MS Word

lease reply to this E-Mail at:
6xf@commspeed.net
r
rnie@cummings.net

hank You....

Report of Harmful Interference From a Broadband Over Power Line Transmission
COTTONWOOD, ARIZONA 86326

Name of complainant: Floyd E. Cummings (Ernie)

Call sign: K6XF

Station location: 133 Lampliter Village

City, State, Zip:_Clarkdale, AZ 86324

Telephone: 928-649-3562

Email: ernie@cummings.net - k6xf@commspeed.net

Description of Interference: Strong interference over-riding WWW on 10 & 15 Mhz

The 20 meter Amateur Radio Band on USB reception was unusable due to BPL

Description: Mobile operation with a Panasonic RF-2200 Receiver 8 Band

1.7 to 30 MHZ double Superhetrodyne (rated excellent HF receiver)

Antenna: 38 inch Whip

Distance of antenna from power distribution line: 20 to 2500 feet

. At 20 feet signal was max meter scale at 2500 feet signal half scale

Log of interference:

Date	Time MST	Frequency Mhz	Receive Mode	Interfering signal strength	Description
5-31-04	10:45 AM	11.4 to 16	AM	Meter Full scale	Continuous broadband carrier with Modulating data sounds 2030 Cherry St Cottonwood,AZ
6-08-04	9:30 AM	10 to 16	AM	Meter Full scale	Continuous broadband Carrier with Modulating Data sounds 1600 Block Cottonwood Street Cottonwood, AZ 86326

Cottonwood

RECEIVED & INSPECTED

JUN 25 2004

FCC - MAILROOM

Federal Communication Commission
Attn: James R, Burtle
Chief, Experimental Licensing Branch
Room 7-A267
445 12th Street SW
Washington, DC 20024
Dated June 17, 2004

Dear Sir:

This is a complaint against interference Amateur Hams Bands from Broadband Power Line System

I have seen the Broadband Power Lines Transmission System (BPL) create a condition where parts of the Amateur Radio Bands Frequencies are totally unusable. This is wrong. It is creating direct interference with frequencies that have been use by amateur radio operators for over 50 years. It is directly interfering with any emergency operation that may take place on these bands. This can effect Police and Fire Departments communications from harmonics created by being too close to the power lines.

The attached data which I personally wittiness as it was taken. This BPL operation on the power is wrong and should be stop. The power lines were designed for electric power and not for some system to radiated RF signals that will interfere with other frequencies that are being used. The Federal Communication Commission should put a stop to this type of operation. How can any one approve this type of operation without knowing what damage it causes.

Sincerely,

Clinton Pierce W7SRC
PMB 445
11881 S Fortuna Rd
Yuma, AZ 85367

Report of Harmful Interference From a Broadband Over Power Line Trial or Deployment

Name of complainant: Chinton L Pierce

Call sign (if applicable): W7SRC

Station location: See DATA Sheets

Mailing address (if different): PMB 445 11881 S Fortuna RD

City, State, Zip: Yuma, AZ 85367

Telephone: 602-448-3265 Email: BOOTSIE1@DIRECway.Com

Description of Interference: POWER LINE INTERFERENCE on many HAM RADIO BANDS

Description of Description of your station

Receiver(s) affected: KENWOOD TS-450S YAESU FT 897

Antenna type: WEBSTER BANDSPANNER

Antenna location: ON Top of CAR AT LOCATIONS ON DATA Sheets

Distance of antenna from own house (feet):

Distance of antenna from neighboring houses (feet):

Distance of antenna from power distribution line or equipment (feet): AMERICAN HERITAGE ≈ 200 ft Sawmill ≈ 2700 ft

Log of interference:

Date	Time	Frequency	Receive Mode	Interfering signal strength	Description
SEE	DATA	Sheets			

DATE: JUNE 17, 2004

DATA LOCATION: COTTONWOOD, ARIZONA AIRPORT N34.735 DEG W112.039 DEG

SYSTEM MANUFACURE HF UNIT	FREQUENCY	SIGNAL STRENGTH	OPERATION MODE
	10 METER BAND		
KENWOOD	28.500 MHZ	S4	USB
YEASU	28.500 MHZ	<S1	USB
YEASU	28.500 MHZ	<S1	FM
KENWOOD	28.500 MHZ	S5	FM
	12 METER BAND		
KENWOOD	24.900 MHZ	S2	USB
KENWOOD	24.900 MHZ	S3	FM
YEASU	24.900 MHZ	<S1	USB
YEASU	24.900 MHZ	<S1	FM
	15 METER BAND		
KENWOOD	21.305 MHZ	S1	USB
KENWOOD	21.305 MHZ	0S	FM
YEASU	21.305 MHZ	0S	USB
YEASU	21.305 MHZ	0S	FM
	17 METER BAND		
YEASU	18.130 MHZ	0S	USB
YEASU	18.130 MHZ	OS	FM
KENWOOD	18.130 MHZ	S1	USB
KENWOOD	18.130 MHZ	S2	FM
	20 METER BAND		
KENWOOD	14.240 MHZ	S6	USB
KENWOOD	14.240 MHZ	S9	FM
YEASU	14.240 MHZ	S4	USB
YEASU	14.240 MHZ	S1-S2	FM
	40 METER BAND		
KENWOOD	7.260 MHZ	S1	LSB
KENWOOD	7.260 MHZ	S2	FM
YEASU	7.260 MHZ	S2	LSB
YEASU	7.260 MHZ	S2	FM

80 METER BAND

YEASU	3.980 MHZ	S2	LSB
YEASU	3.980 MHZ	S3	FM
KENWOOD	3.980 MHZ	S7	LSB
KENWOOD	3.980 MHZ	S9	FM

LSB (LOWER SIDE BAND)
USM (UPPER SIDE BAND)
FM (FREQENCY MODUALTION)

KENWOOD UNIT TS-450S MODEL
YEASU UNIT FT-897 MODEL

DATE: JUNE 17, 2004

DATA LOCATION: AMERCIAN HERITZGE,ARIZONA

N34.73272 DEG W112.00520 DEG

SYSTEM MANUFACURE HF UNIT	FREQUENCY	SIGNAL STRENGTH	OPERATION MODE
	10 METER BAND		
KENWOOD	28.500 MHZ	20 DB OVER S9	USB
YEASU	28.500 MHZ	70-=80 DB OVER S9	USB
YEASU	28.500 MHZ	METER PEGGED	FM
KENWOOD	28.500 MHZ	60 DB OVER S9	FM
	12 METER BAND		
KENWOOD	24.900 MHZ	S3	USB
KENWOOD	24.900 MHZ	S3	FM
YEASU	24.900 MHZ	0	USB
YEASU	24.900 MHZ	0	FM
YEASU	24.900 MHZ	0	PACKET
	15 METER BAND		
KENWOOD	21.305 MHZ	59 DB OVER S9	USB
KENWOOD	21.305 MHZ	60 OVER S9	FM
YEASU	21.305 MHZ	65 DB OVER S9	USB
YEASU	21.305 MHZ	95 DB OVER S9	FM
YEASU	21.305 MHZ	95 DB OVER S9	PACKET
	17 METER BAND		
YEASU	18.130 MHZ	0	USB
YEASU	18.130 MHZ	O	FM
KENWOOD	18.130 MHZ	S5	USB
KENWOOD	18.130 MHZ	S3	FM
YEASU	18.130 MHZ	0	PACKET
	20 METER BAND		
KENWOOD	14.240 MHZ	30 DB OVER S9	USB
KENWOOD	14.240 MHZ	60 DB OVER S9	FM
YEASU	14.240 MHZ	85 DB OVER S9	USB
YEASU	14.240 MHZ	METER PEGGED	FM

40 METER BAND

KENWOOD	7.260 MHZ	10 DB OVER S9	LSB
KENWOOD	7.260 MHZ	60 DB OVER S9	FM
YEASU	7.260 MHZ	58 DB OVER S9	LSB
YEASU	7.260 MHZ	82 DB OVER S9	FM
YEASU	7.260 MHZ	82 DB OVER S9	PACKET

80 METER BAND

YEASU	3.980 MHZ	55 DB OVER S9	LSB
YEASU	3.980 MHZ	65 DB OVER S9	FM
KENWOOD	3.980 MHZ	10 DB OVER S9	LSB
KENWOOD	3.980 MHZ	60 DB OVER S9	FM

LSB	(LOWER SIDE BAND)
USM	(UPPER SIDE BAND)
FM	(FREQENCY MODUALTION)
PACKET	(PACKET RADIO)

KENWOOD UNIT	TS-450S	MODEL
YEASU UNIT	FT-897	MODEL